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Dear USPTO, enclosed within this correspondence are two documents:

1. A response to a Detailed Action of a non-final claims rejection notice regarding patent application 10/803,626 by Robert J. Rapp, Customer Number 41400 submitted within the 3 month time period specified by the USPTO. The Detailed Action is dated 12/16/2005.

2. A USTPO form SB124A Request for Customer Number Data Change as Mr. Rapp/customer number 41400 has a new address and phone number.

Thank you,

Robert J Rapp

Robert J. Rapp

March 8, 2006

Response to a Detailed Action of a non-final claims rejection notice regarding patent application 10/803,626 mailed Dec. 16, 2005 by the USPTO
Note: Reference Information re: Patent Application 10/803,626: Inventor Robert J. Rapp Customer Number 41400 has a new address & phone number: 23333 Ridge Route Dr. #126 Lake Forest Ca. 92630; phone (949) 583-1296: email is still rapprj@sbcglobal.net

Dear USPTO, this is a response to a Detailed Action of a non-final claims rejection notice regarding patent application 10/803,626 mailed Dec 16, 2005 by the USPTO. Robert J. Rapp is the inventor who submitted patent application 10/803,626 the customer number 41400 is associated with this patent. This response is being sent to the USPTO on March 8 2006 within the 3 month time period as stipulated by the USPTO. The Patent Examiner is Truc T. Nguyen, the patent application is assigned to Art Unit 2833.

Thank You, Robert J. Rapp

Included within this response are details that describe how patent application 10/803,626 was not an obvious invention at the time the invention was made to a person having ordinary skill in the art, as it has various non-obvious aspects and yields numerous non-obvious benefits. Immediately below is a list of the contents of this response.

A. Various Non-Obvious Aspects & Benefits of the device described by Patent Application 10/803,626.

   A.1 Summary List Patent Application 10/803,626 Non-Obvious Aspects & Benefits:

   A.2 The device is functional and extendable while immersed in a conductive and/or corrosive fluid and other conductive and/or corrosive environment:

   A.3 Multi-Mode Functionality Detailed Description: Modules can communicate when connected or when separate; non-contact signals do not require devices to be physically connected yielding numerous non-obvious benefits:

   A.4 Ease of Expansion by an Operator has limited Dexterity or is Impaired: This is true for a number of complex reasons described within the response, these reasons include, yet are not limited to: Alignment pins can have loose tolerances when non-contact signals are used: Most metallic contacts require tighter tolerances, are specially designed expensive interconnects, or would expose greater metallic surface area to environments that short and degrade metallic contacts.

   A.5 Crush resistance: Able to withstand high pressure environments because of fluid filled modules.

B. Significant Differences in Prior Art referenced in the Detailed Action, as compared to Patent Application 10/803,626.

C. Significant differences in other prior art as compared to Patent Application 10/803,626.

A. Various Non-Obvious Aspects & Benefits of Patent Application:

Patent Application 10/803,626 is about how to make an electronic device that is functional and extendable while immersed in harsh fluids and other harsh environments. One significant application is while diving in salt water at depth in a high pressure environment. The method described in patent application 10/803,626 has several non-obvious aspects that yield numerous non-obvious benefits that are reviewed in detail in the paragraphs below.

A.1: Summary List Patent Application 10/803,626 Non-Obvious Aspects & Benefits:

1. Functionality & Extendibility in a plurality of ways while immersed in a harsh fluid as there are no exposed metallic electrical interconnects to short, corrode, wear, or bend.
2. Multi-mode Operation – modules can operate when connected & when the modules are not connected. Because non-contact signals travel over a distance, modules of this sort can operate when they are not connected.
3. Functionality & Extensibility when immersed in an environment that dissipates or attenuates non-contact signals rapidly. When modules are connected their signals are directed maximizing signal quality.
4. Enhanced Security when modules are connected as compared to when modules are separate: When these modules are connected their non-contact communications are contained within the device, preventing eavesdroppers & hackers from exploiting these communications. When separate the devices could still communicate, separate devices that use non-contact communications may be convenient in certain circumstances yet their communications may be snooped.
5. Enhanced resistance to interference from other non-contact signal sources, when modules are connected their non-contact communications are contained and directed enhancing the efficiency of non-contact communication.
6. Ease of expansion when an operator has limited dexterity or has an impairment:
7. No need for expensive hermitically sealed metallic interconnects or expensive corrosion resistant interconnects like gold plated interconnects.
8. Longevity: No metallic contact degradation to limit the device's lifespan.
9. Electro-Static Discharge Protecting Built in at the Module Level lasts through each Modules Lifetime & starts on the manufacturing floor as soon as the module is sealed: as there are no metallic contacts for electro-static discharge to couple to.
10. Ease of Transportation:
11. May communicate with other non-contact devices when modules are separate.
12. Able to withstand high pressure environments because of fluid filled modules.

A.2 The device is functional and extendable while immersed in a conductive and/or corrosive fluid and other conductive and/or corrosive environments:

There are no exposed metallic electronic interconnects to short, corrode, wear, or bend. Devices that use metallic interconnections if designed to be expandable in these environments must expose some part of their metallic interconnects to the conductive and/or corrosive environment limiting the performance and useful life of those metallic interconnects.

Once the contacts themselves are exposed to a conductive and/or corrosive environment they can corrode and electrically short through long term and short term processes: A highly conductive fluid can short contacts immediately: A mildly corrosive fluid can degrade contacts over time, the processes of oxidation, & etching cause metal to be eroded, once eroded the metal will tend to deposit. These processes can easily cause both contact degradation & shorting.

Since both short term & longer term processes can attack, degrade, and wear metallic interconnects and the non-contact approach has no metallic interconnects, the non-contact approach is superior as it has non-oblivious benefit longevity, it is more highly resistant to conductive & corrosive fluids and environments as compared to other approaches.

This is true even when hermitically sealed metallic interconnects are used as some portion of the metallic interconnect must be exposed when interconnecting modules. Hermitically sealed metallic interconnects are also expensive.

Furthermore even if gold plated interconnects were used to resist corrosion, they still can be shorted, even shorted immediately if immersed into a highly conductive fluid, and the gold plating will wear down after numerous connect/disconnect cycles exposing the underlying interconnect to corrosion. Also corrosion resistant metallic interconnects are expensive.

Frequently metallic interconnects can be bent, this is especially true if the contacts protrude and if they are small. If the metallic interconnects are made larger to prevent them from being easily bent, the larger contact will have more metal exposed to the environment making them more susceptible to shorting or corrosion. If the contacts are specially designed to be small and resistant to bending, those interconnects themselves would be expensive.

Electronics that use metallic electrical interconnects are susceptible to damage from electrostatic discharge, often integrated circuits require transient suppression devices to protect them from ESD. By

using non-contact signals, metallic contacts are eliminated; the device has ESD protection built in; protection that starts before the module leaves the manufacturing floor and that lasts throughout each and every modules life.

A.3 Multi-Mode Functionality Detailed Description: Modules can communicate when connected or when separate; as non-contact signals do not require devices to be physically connected, yielding numerous non-obvious benefits.

Patent application 10/803,626 paragraph 43 refers to this multi-mode aspect of this approach: "Radio, including industry standard radio communication techniques enable isolated devices to communicate, if these modules are aligned and connected in pre-determined sequences forming a single physical device (a physically connected device) this constitutes a device consistent with this invention."

Because of the use of non-contact communication mechanisms, modules may communicate when physically connected or when they are not physically connected because non-contact communication mechanisms can communicate over a distance. Even though the device described in patent application 10/803,626 yields many of its benefits when modules are connected, the modules can still communicate when separated. This is true even if transmit power is limited, and is true for all forms of non-contact communication technologies: Thus the multi-mode functionality is a non-obvious aspect that yields several non-obvious benefits derived by patent application 10/803,626 that are described below.

Once the modules are physically connected, their non-contact communication transceivers will be in very close proximity to each other maximizing signal quality, enabling the device to operate environments or fluids that dissipate or degrade non-contact communications rapidly. In this case when connected, the modules could communicate & operate reliably in environments where they could not operate when disconnected.

Thus: Non-contact communication mechanisms such as RF, infrared, and optical signals are attenuated or dissipated in a fluid, disconnected or separate devices that rely on these signals if immersed would not operate reliably as the signals would be attenuated or dissipated in the fluid. Thus typical devices that use non-contact signals to communicate, like many wireless devices used today, could not if immersed in a fluid that attenuated or dissipated their signals rapidly: this is true even if they were designed to be water resistant. By connecting modules as described in patent application 10/803,626, however the devices would communicate reliably as their non-contact signal sources would be in very close proximity to and directed at another modules non-contact signal receivers.

Furthermore when connected the non-contact communications are contained within the device preventing eavesdroppers or hackers from receiving & exploiting those signals, thus providing the non-obvious benefit of security over separated devices using non-contact communications.

Containing non-contact communications also prevents interference from other non-contact signal sources from degrading the performance of non-contact inter-module communications.

A set of connected modules of modest size are also easier to transport than a bunch of separate modules as they are easy to pick up as a single unit. If a large unit were assembled using this approach, the unit could be separated in easy to manage segments in virtually any environment, even while immersed in a conductive and caustic fluid.

A.4 Ease of Expansion by an Operator has limited Dexterity or is Impaired: This is because alignment tolerances may be relaxed non-contact signals as compared to using metallic contacts:

The device can be easily expanded when wearing a protective suit, when wearing gloves, when someone's hands are cold, or when an operator is otherwise impaired. For example device can be easily expanded by a diver in salt water wearing gloves with cold hands for example can connect the modules easily; this is because non-contact signals can be sent & received without over a gap and can be focused at the receiver: Therefore the alignment pins may have loose tolerances; making assembly easier & costs lower. Connecting electronic modules by using metallic interconnects often requires more precision, specially designed expensive interconnects, or large areas of exposed metal to accommodate loose tolerances. Since metallic electrical interconnects rely on two metallic surfaces touching, rubbing or wiping against each other the greater the rubbing or wiping surface, the more metallic surface area that there is to corrode or short when exposed to a conductive or corrosive fluid or environment.

Since force is required to mate many forms of metallic contacts devices that use them are difficult for an impaired person to connect. Metallic contacts that do require smaller forces are not robust, or are expensive. Since metallic electrical interconnects rely on two metallic surfaces rubbing or wiping against each other the greater the rubbing or wiping surface, the more metallic surface area that there is to corrode or short when exposed to a conductive or corrosive fluid or environment.

A.5 Crush resistance: Able to withstand high pressure environments because of fluid filled modules.

Another aspect of this invention includes the use of modules that are fluid filled to resist crushing in high pressure environments. In this case the modules would be filled with a non-conductive, non-corrosive fluid that can be used with electronic devices; such fluids are commercially available.

The Detailed Action does not cite any reference challenging the claim related to this, so I shall not elaborate further about this aspect.

B. Significant Differences in Prior Art referenced in the Detailed Action, as compared to Patent Application 10/803,626.

This prior art simply does not address consider the array of benefits derived by patent application 10/803,626 and; these devices are not designed to be functional and expandable while immersed conductive and/or corrosive fluid or environment, to be immersed in such a fluid at depth, or to have the multi-mode benefits discussed earlier in this response.

B.1: Patents by Kalt (US 3,205,298) and Tanaka (US 6,7875,282) referenced by the USPTO in the Detailed Action of a non-final claims rejection notice regarding patent application 10/803,626 are significantly different from patent applications 10/803,626: Kalt & Tanaka describe devices that are fundamentally different; their devices are not engineered to, or intended to be expandable & functional while immersed in a fluid, in a conductive or corrosive fluid, or in other conductive or corrosive environments; whereas the device described in patent application 10/803,626 is intended to be used & expandable in such environments and provides numerous other non-obvious benefits that are beyond the scope of Kalt's and Tanaka's devices.

Kalt (US 3,205,298) stacks a series of electronic circuit boards: the design cannot function or be expanded while immersed in a conductive or a corrosive fluid as the circuit boards are themselves not sealed, internal electronic circuits and inter-module interconnections are exposed to the environment. Immersing Kalt's device in a conductive or corrosive fluid in a powered off state for a brief period of time would likely damage it. Even if Kalt's circuit boards themselves were sealed the interconnections between the circuit boards themselves may be damaged from conductive or corrosive fluids or environments. The lager the interconnect the more surface area that's exposed to corrode or short: The smaller the interconnect the more difficult it is to align and assemble Kant's circuit boards, and the easier it is to bend an interconnect itself. Metallic interconnects of this sort rely on two metallic surfaces rubbing against each other, pressing these contacts together requires force such that someone wearing

gloves, or with limited dexterity could not easily connect Kant's circuit boards. Furthermore Kant's circuit boards could never communicate when separate. Thus patent application 10/803,626 is designed with several non-obvious aspects that provide several non-obvious benefits that Kant's method for stacking circuit boards does not.

Patent 6,875,282 by Tanaka describes a device with the primary function of protecting electronic substrates from micro-contaminates when transporting them from one clean manufacturing process to another. Even though Tanaka uses non-contact signals for sensing events & uses inductive power transfer, the device described in patent application 10/803,626 has several non-obvious aspects & yields a host of non-obvious benefits that Tanaka's approach & device do not; therefore patent application 10/803,626 is not an obvious derivative of Tanaka's patent 6,875,282: Tanaka's device is not designed to be functional or extendable while immersed in a fluid, or in a conductive and/or caustic fluid. Tanaka's device is not expandable in a plurality of ways. Tanaka's device is not sealed throughout it's lifecycle as the device opens as part of its basic function. Tanaka's device is not designed to be handled, used, & expanded by someone who has limited dexterity. Tanaka's device has no need or facility for modules to communicate while attached & separate, and therefore is not intended to yield the benefits associated with multi-mode functionality as described earlier as non-obvious attributes & benefits associated with patent application 10/803,626. Also the substrates being transported by Tanaka's device themselves are not yet manufactured into a functional configuration or into a final component configuration.

Furthermore Tanaka's approach is not well suited to the range of environments or applications described in patent application 10/803,626 for several reasons: If immersed in a contaminated fluid under high pressure the doors in Tanaka's device would lilely leak & the fluid would leave a residue on the devices exterior: Even if Tanaka's transport device were exposed to a gaseous or a liquid environment that left modest amount of moderately to highly caustic contamination residue on the exterior of the device would threaten the device's ability to perform its function, as simply opening the doors would create a shower of contaminates, some of which would likely land on the substrates. Tanaka's device simply works best in relatively clean environments, not in the moderate to highly contaminated environments.

The device described in patent application 10/803,626 is designed & intended work in the harshest environments it provides a host of benefits that Tanaka's patent does not address.

C. Significant differences in other prior art as compared to Patent Application 10/803,626.

The Information Disclosure Statement submitted with patent application 10/803,626 referenced numerous modular electronic patents that align & connect electronic modules in various ways, some of which are subtly different from each other, in each case these devices use metallic interconnects for communications between modules. The prior art search performed in respect to patent application 10/803,626 did not find any patents that described using non-contact signals in physically connected devices that are expandable in a plurality of ways, or any prior art that yielded the overall set of benefits derived from patent application 10/803,626. The devices described by these patents are not functional and expandable when immersed; if immersed in a conductive and corrosive fluid, these devices would not function. The device described in patent application 10/803,626 is significantly different from any of this prior art.

The patents referenced in the IDS were: Urfirer (4,456,267); Hahs Jr. (4,969,827); Ellingen et al (4,942,356); Annegawa (4,978,840); Dux et al (5,655,922); Melane et al (6,039,414); Hunter (6,201,698); and Hall (6,402,031).